

**SUPERJUNCTION DEVICE WITH ADDED CHARGE  
AT TOP OF PYLONS TO INCREASE RUGGEDNESS**

**ABSTRACT OF THE DISCLOSURE:**

The P type pylons in a superjunction device have an increased concentration at their top to modify charge balance, such that the top of the P regions are not fully depleted during blocking voltage operation, while the remainder of the P type pylons are in charge balance with the surrounding N body region. Avalanche current can then be diverted to the central portion of the P body (for N-channel device) channel region at the top of the pylon and away from the  $R_b'$  under the source to increase ruggedness (turn on of the parasitic bipolar transistor due to avalanche current flow through  $R_b'$ ) with very little sacrifice of breakdown voltage due to the increased concentration at the top of the pylons.